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ABSTRACT

Two energy education programs are described in this informational brochure. Both "Captain Power" for second graders and "Power Quiz" for fifth graders are designed to teach energy concepts and to help students develop and use conservation skills. Program outcomes focus on energy concepts, types of energy, energy costs, energy needs, and conservation. Program materials for each include teacher's guide, filmstrip(s) and tape(s), picture cards, record sheet, and multiple copies of pupil and parent materials (exercises, pre- and post-tests, leaflets, badges). In addition, the second grade program has two posters and two sets of three hand puppets. Illustrations depict samples of materials including procedures in the teacher's guide, pre-test, parent materials and take-home exercises, filmstrips, lessons and exercises, post-test, and program record sheet. A separate document contains results of tryouts and field tests including scores on pre- and post-tests, teacher reactions, information from record sheets, pupil reactions, parent reactions, and home energy audits. The May 1979 issue of the "Elementary School Journal" contained an article entitled "Captain Power and Power Quiz: Two New Energy Education Programs," referencing this field test data document. (DC)

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Introducing:

The Captain Power

and The Power Quiz

Energy Education Programs

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Captain Power and Power Quiz: An Overview

These energy education programs introduce second and fifth graders to basic energy concepts and help them develop energy conservation skills to use daily.

The second-grade, Captain Power, and fifth-grade, Power Quiz, programs include:

- Complete sets of classroom-tested, full-color materials for teachers and students.
- Specific learner outcomes that cover a wide range of energy skills and concepts, including sources, production, distribution, supply, costs and conservation.
- Pretests and posttests.
- Motivational filmstrips and graphic aids.
- Illustrated student exercises.
- Informative parent materials, with suggestions for family participation.

Program Development

Developed over a two-year period by a team of teachers, curriculum specialists and energy experts, the Captain Power and Power Quiz programs provide a basic skills approach to energy education for the elementary curriculum.

The programs have been successfully tested in a wide range of schools with children from many backgrounds. Teachers with little or no energy background can obtain impressive program results in as little as three weeks. Documentation of field testing is available (see back cover).

Program Outcomes

Program instruction is keyed to these specific learner outcomes:

Captain Power—Second Grade

1. **Understanding Energy Concepts**
   Pupils learn the following energy concepts:
   - We use energy from several sources to do many things.
   - Energy is a product produced and delivered to us by companies.
   - We pay for the energy we use.
   - We need to conserve energy and not waste it.
   - There are many ways young people can help conserve energy.
2. **Identifying Kinds of Energy**
   Pupils identify which kinds of energy (gasoline, electricity, natural gas) are used to operate various home energy users (refrigerators, televisions, water heaters, cars, etc.).
3. **Identifying Energy Costs**
   Pupils determine which of several given energy users would cost the most to operate during a year of average use by a typical family.
4. **Determining Most Needed Energy Users**
   Pupils classify given energy users as to whether they are "needed" or "nice to have."
5. **Practicing Good Conservation Habits**
   Pupils use basic energy conservation practices at home (e.g., turning off unused lights and appliances).

Power Quiz—Fifth Grade

1. **Understanding Energy Concepts**
   Pupils learn the following energy concepts:
   - We presently rely on fossil fuels for most of our energy.
   - Our limited fossil fuels cannot keep up with increasing energy demands.
   - We need time and money for scientists and engineers to develop additional energy sources to supplement fossil fuels.
   - Energy and water conservation can help extend fossil fuels while we develop additional energy sources.
2. **Determining Needed Energy Users**
   Pupils state which of several given energy users would be most needed most by typical families.
3. **Identifying Energy Costs**
   Pupils identify the range of yearly operating costs for given energy users.
4. **Determining Effective Conservation Practices**
   Pupils identify which of several given conservation practices would normally save the most energy and money during a year's time in typical homes.
5. **Practicing Good Conservation Habits**
   Pupils follow sound basic energy conservation practices at home.

Program Materials

Both programs are organized into 15 lessons, requiring 20-30 minutes daily for Captain Power and 30-40 minutes daily for Power Quiz.
Each classroom set contains these materials:

Captain Power—Second Grade

- Teacher's Guide
- Captain Power Filmstrip, Audio-cassette, and Teacher's Script
- Set of 26 Energy User Picture Cards
- Energy Distribution Poster
- Program Record Sheet
- Yearly Energy Costs Poster
- Two sets of three hand puppets
- 30 copies of each of the following pupil and parent materials:
  - Nine Pupil Exercises, One Take-Home Exercise
  - Pretests and Posttests
  - Parent Information Leaflets
  - Energy Saver Badges

Power Quiz—Fifth Grade

- Teacher's Guide
- Power Quiz Filmstrip, Audio-cassette, and Teacher's Script
- Sy Malone, Energy Sleuth Filmstrip, Audio-cassette and Teacher's Script
- Set of 30 Energy User Picture Cards
- Program Record Sheet
- 35 copies of each of the following pupil and parent materials:
  - Pupil Practice Exercise Booklets (10 exercises, 36 pages)
  - Pretests and Posttests
  - Parent Information Leaflets
  - Two Take-Home Exercises
  - Energy Sleuth Badges

Program Activities

OVERALL PROCEDURES

Outlines instructional procedures for all 15 lessons.

Sample on page 3

GIVE PRETEST

Requires about 20-30 minutes. Classes average from 40-60%.

Sample on page 4

SEND HOME PARENT MATERIALS AND TAKE-HOME EXERCISES

Parents are urged to help students apply energy skills at home.

Sample on page 5

SHOW AND DISCUSS FILMSTRIPS

"Captain Power," an energy wonderwoman, introduces second-graders to energy skills. In the fifth grade, "Power Quiz" tests energy knowledge and "Sy Malone, Energy Sleuth," introduces conservation.

Sample on page 6 - 7

WORK THROUGH LESSONS AND EXERCISES

Two or more exercises for each skill. Students keep corrected materials for reference.

Sample on page 8 - 9

GIVE POSTTEST

Most classes average 80% or higher.

Sample on page 10

COMPLETE PROGRAM RECORD SHEET

Records pupils accomplishments and assures replacement materials for next year.

Sample on page 11

Overall Procedures—Captain Power Teacher's Guide

- Teacher-led group activities throughout.
- Both group and individual practice.
- Students always correct errors.
- Answer keys show entire exercise.

LESSON 5: Introduction to Kinds of Energy

Materials:

- Completed Take-Home Exercise on Kinds of Energy
- Pupil Energy Exercise 3: Kinds of Energy
- Energy-term magnets

A. **Discuss completed take-home exercise on kinds of energy**

- Ask children to share what they learned at home regarding their home heaters, ranges & ovens, water heaters and clothes dryers. Tell the children that many home heating systems are composed of a central heater or furnace whose warm air is blown to various rooms through pipes or ducts. The thermostat (shown in home heater illustration) controls the temperature of the entire system.
- Tally how many families have gas appliances versus electric appliances. Point out that most other home appliances run on electricity (e.g. refrigerators, washing machines, televisions, blenders, etc.)

B. **Have children complete Exercise 3**

- Give each child a copy of Exercise 3. After you have worked through the examples and the first few items with the pupils, you might want to let them proceed on their own before correcting answers. Be sure pupils recognize and correct any errors.
- Direct pupils to color the pictures on the back of Exercise 3 after they complete the exercise or when they take it home.

C. (Optional) **Conduct selected enrichment activities**

- Below are several optional enrichment activities. Any could be conducted at this point in time or more. Others may be used each week or other times during the program.
  - Have pairs or small groups of pupils use the term magnets to plan and present short energy skits. For example, Captain Power helps Wasteful Willie save energy.
- Have children cut out pictures of energy users from old newspapers and magazines, then classify each as to the kind of energy it uses.
- Have students, alone or in groups of two or three, plan and give pantomimes of various energy users for the class to guess (e.g. washing machine, television, second place).
- Have students plan and give short talks representing animated energy users for the class to guess (e.g. "I'm one of your favorite things. You turn me on all the time. Sometimes I make you laugh, and sometimes I make you cry. Don't forget to turn me off when you're finished with me.")
- Have pupils plan and give talks on "What it would be like if we didn't have electricity, gasoline, refrigerators, televisions, etc."

Exercise 3

Sample Materials

Pretest—Captain Power

- Four-page tests keyed to program outcomes.
- Second-graders mark answers as teacher reads test aloud.
- Pretest results recorded on Program Record Sheet.

CAPTAIN POWER ENERGY EDUCATION PROGRAM: PRETEST

Name _____

A For each question below, listen as it is read aloud. Then answer the question by drawing a circle around (Yes) or (No)

1.	Can energy be used to make things cold?	Yes	No
2.	Does the water company send cold water and hot water to our homes?	Yes	No
3.	Are natural gas and gasoline the same thing?	Yes	No
4.	Will most of our energy in the future come from oil and natural gas?	Yes	No
5.	By "fossil fuels," do we mean oil, electricity, and natural gas?	Yes	No
6.	Can water be used to help make electricity?	Yes	No
7.	Do most families spend more money for electricity than for food?	Yes	No
8.	Will we use other kinds of energy in the future besides fossil fuels?	Yes	No
9.	Do children use fossil fuels?	Yes	No
10.	Is there an electric meter at most of our homes?	Yes	No
11.	Do electric companies use lots of fossil fuels?	Yes	No
12.	Once each year, do the water and power companies send bills to homes?	Yes	No

Page 1

Parent Materials and Take-Home Exercises—Power Quiz

- Parents like to know what their children are learning in school.
- The whole family is encouraged to participate in energy and money-saving projects.
- In each program, there are Take-Home Exercises to be completed with parents' help and returned to school for discussion.

We make it fun.

Learning doesn't have to be a grind. In fact, kids learn more when they're having fun. So we've developed some colorful and entertaining materials for the energy education program. There are two filmstrips, "Sy Malone, Energy Sleuth," starring a Bogart-type character, and "Power Quiz" a takeoff on a TV game show. There are picture cards and posters, conservation brochures and even an Energy Sleuth badge.

How you can help.

You can help reinforce all the things your child learns about energy in school by following up at home. If energy and water conservation are important to you, they will be to your children, too. So we're asking you to help them complete some energy worksheets they'll be bringing home during the program.

First, there's the
Home Energy Survey

What your child does:
Lists energy users around the house and identifies different kinds of energy.

What you can do:
Explain which appliances use either natural gas or electricity.
Discuss how natural gas and electricity work and offer safety reminders.

Sample Materials

Filmstrips—"Captain Power"

- All filmstrips are full color with lively sound tracks.
- Filmstrips entertain as well as inform.
- Teacher's Guides contain complete procedures for filmstrip introduction and discussion.

Filmstrips— "Power Quiz "

- Students can relate to the familiar TV game show format.
- Wide variety of characters introduced.

"Sy Malone, Energy Sleuth"

- Introduces a Bogart-type character, who investigates energy waste.
- Encourages students to become "energy sleuths" in their own homes.

Lessons and Exercises—Captain Power

- Each exercise relates directly to one of the Program Outcomes.
- One of nine pupil exercises.
- Many exercises have Captain Power cartoons on the back to color.

CAPTAIN POWER ENERGY EDUCATION PROGRAM

Name _____

Needed Energy Users

Energy Exercise 6. Mark the box ☒ under each picture that tells how much that energy user is needed by most families.

Example:

Range & Oven

☒ Needed
☐ Nice-to-Have

Radio

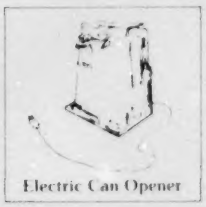
1. ☐ Needed
☐ Nice-to-Have

Water Heater

2. ☐ Needed
☐ Nice-to-Have

Refrigerator

3. ☐ Needed
☐ Nice-to-Have



Electric Can Opener

4. ☐ Needed
☐ Nice-to-Have

Vacuum Cleaner

5. ☐ Needed
☐ Nice-to-Have

Home Lights

6. ☐ Needed
☐ Nice-to-Have

Home Heater

7. ☐ Needed
☐ Nice-to-Have

Washing Machine

8. ☐ Needed
☐ Nice-to-Have

Lessons and Exercises—Power Quiz

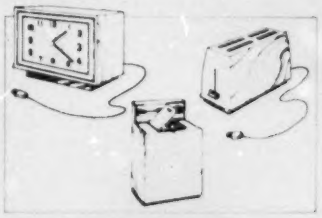
- **This exercise is from the 36 page Power Quiz Pupil Exercise Booklet**

Review—Needed Energy Users

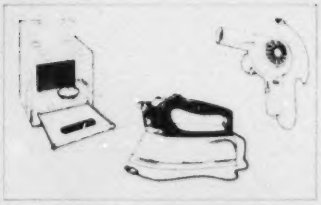
Practice Exercise 9.
Part A.

Look at each group of energy users below.
Mark ☒ the most needed energy user in each group that would be hardest for most families to replace or do without.

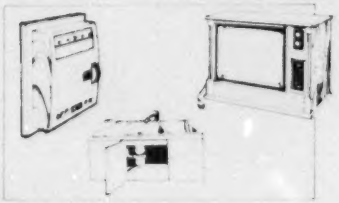
1. ☐ Refrigerator
   ☐ Vacuum Cleaner
   ☐ Radio



2. ☐ Electric Clock
   ☐ Washing Machine
   ☐ Toaster

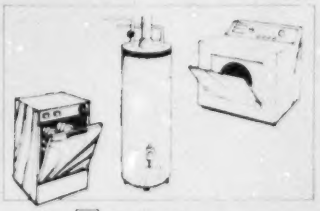


3. ☐ Range & Oven
   ☐ Iron
   ☐ Hair Dryer



4. ☐ Home Heater
   ☐ Garbage Disposal
   ☐ Television

5. ☐ Electric Can Opener
   ☐ Electric Toothbrush
   ☐ Radio



6. ☐ Dishwasher
   ☐ Water Heater
   ☐ Clothes Dryer

Go on to parts B and C

Posttest—Power Quiz

- Posttests parallel Pretests.
- Posttests are keyed to program outcomes.

C Look at each energy user below. Mark ☒ the box under the cost range that best describes how much money it takes to operate that energy user each year. Choose the cost based on an average family's use during a year's time.

	Yearly Cost		
	Low: Less than $10	Medium: $10 to $50	High: More than $50

19.
Toaster
Low Medium High ☐ ☐ ☐

20.
Refrigerator
Low Medium High ☐ ☐ ☐

21.
Gas Range & Oven
Low Medium High ☐ ☐ ☐

22.
Electric Mixer
Low Medium High ☐ ☐ ☐

23.
Family Car
Low Medium High ☐ ☐ ☐

24.
Electric Clothes Dryer
Low Medium High ☐ ☐ ☐

Program Record Sheet

- Teacher's copy documents student accomplishments.
- Mailed copy shows scores only, not student names.
- Allows for teacher reactions and suggestions.
- Assures replacement materials.

The Captain Power Energy Education Program Record Sheet

Teacher: _____ School: _____

Grade Level(s): _____ District: _____

(After you finish teaching the program, please fill in the information requested on this sheet. Keep the original for your records. Fold and drop the copy in the mail—no stamps required. Thank you.)

Program Test Results

Pupil	Pretest Score (30 possible)	Posttest Score (30 possible)

For More Information

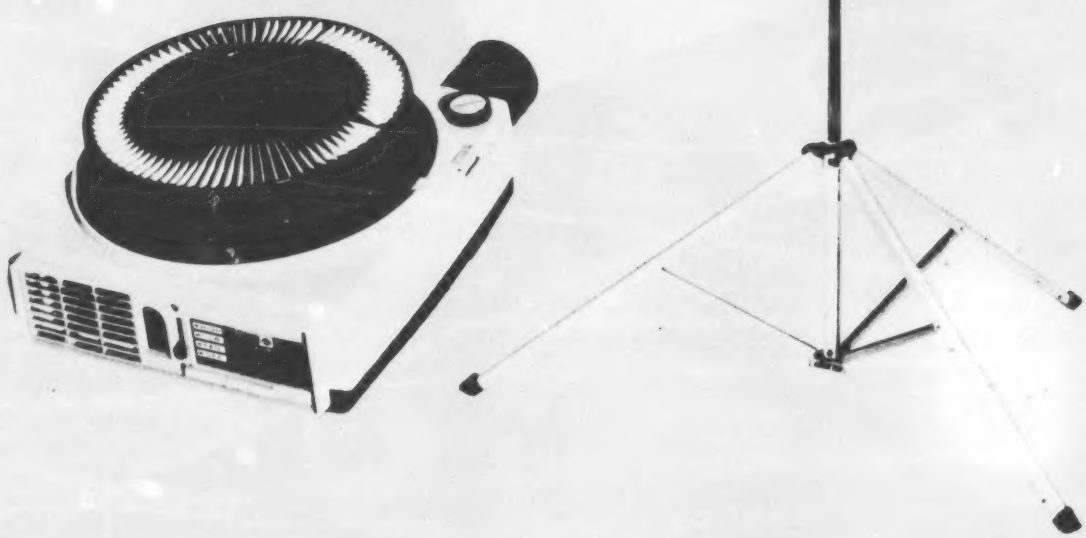
We hope you'll find The Captain Power and The Power Quiz Energy Education Programs useful and interesting additions to your curriculum.

For additional information about the programs or a schedule of teacher inservice workshops, in the San Diego area, please contact:

San Diego Area Energy Education Committee
San Diego Gas & Electric, Room 1509
P.O. Box 1831
San Diego, CA 92112
Or call: (714) 232-4252 ext. 1387 or 1649.

For information on program availability outside the San Diego area, please contact:

Fred C. Niedermeyer, Ed.D.
Energex
P.O. Box 7000-136
Palos Verdes Peninsula, California 90274
Or call: (213) 377-0192



ENERGY
Energy Education Programs
P.O. Box 7000-136 ○ Palos Verdes, CA 90274 ○ (213) 377-0192

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July, 1979

TO: Persons Requesting Field Test Data

FROM: Dr. Fred C. Niedermeyer FN

SUBJECT: REQUESTS FOR FIELD TEST DATA FROM DEVELOPMENT OF THE CAPTAIN POWER AND POWER QUIZ ENERGY EDUCATION PROGRAMS

The May, 1979 issue of The Elementary School Journal contained an article describing the development of the Captain Power and Power Quiz energy education programs by the San Diego Energy Education Task Force. (F. Niedermeyer and E. Roberson, "Captain Power and Power Quiz: Two New Energy Education Programs")

A footnote in the article stated that detailed analyses of all data on tryouts and field tests were available from the authors upon request. The attached documents comprise those analyses.

We share your interest in energy education. Please feel free to contact us further is you have questions about the development or availability of the two programs.

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Table 1. Mean Class Pretest and Posttest Scores During Spring 1978 Tryout of The Captain Power Energy Education Program

Class	School	District	Number of Pupils			Pretest (Mean %)	Posttest (Mean %)
			First Grade	Second Grade	Third Grade		
1	Dewey	S.D. Unified		16	16	52	73
2	Chesterton	S.D. Unified		30		54	84
3	Bay Park	S.D. Unified		24	5	57	85
4	Bay Park	S.D. Unified	12	14		50	78
5	Santa Fe	Vista Unified		23		55	85
6	Bay Park	S.D. Unified			27	58	92
7	Kellogg	Chula Vista		12	16	63	95
8	Buena Vista	Carlsbad		8	20	57	90
9	Crown Point	S.D. Unified		30		56	84
10	Rancho Santa Fe	Rancho Santa Fe			23	59	90
11	Madison	Cajon Valley Union		30		57	89
12	Hill Creek	Santee			27	65	92
13	Francis Parker	Private		20		58	90
14	Francis Parker	Private		22		57	85
15	Scripps	S.D. City		21		62	92
16	Santa Fe	Vista Unified			24	49	87
17	Santa Fe	Vista Unified			25	60	91
18	Santa Fe	Vista Unified		24		52	88
19	Santa Fe	Vista Unified		12	11	54	85
20	Vista La Mesa	Lemon Grove		13	13	59	90
	Totals		12	299	207	57%	87%

Table 2. Mean Class Pretest and Posttest Scores During Spring 1978 Tryout of The Power Quiz Energy Education Program

Class	School	District	Number of Pupils		Pretest (Mean %)	Posttest (Mean %)
			Fifth Grade	Sixth Grade		
1	Santa Fe	Vista Unified	24		52	71
2	Francis Parker	Private	22		65	87
3	Jones	S. D. City	12	20	61	86
4	Santa Fe	Vista Unified	25		55	77
5	La Jolla	S. D. City	16	15	61	73
6	Rancho Santa Fe	Rancho Santa Fe	21		64	87
7	Vista La Mesa	Lemon Grove	30		50	75
8	Libby	Oceanside	36		48	80
9	Francis Parker	Private	22		66	84
10	?	?	27		62	83
11	Green	San Diego		30	61	85
12	Green	San Diego		31	73	88
13	Paradise Hills	S. D. Unified	32		53	82
14	Jackson	S. D. Unified	29		47	75
15	Green	San Diego		31	59	83
16	Fletcher Hills	La Mesa-Spring Vly.	31		59	85
17	Rancho Santa Fe	Rancho Santa Fe	24		57	84
18	O. W. Holmes	S. D. City	29		56	80
19	Jones	S. D. City		33	54	79
20	Santa Fe	Vista Unified	23		56	68
21	Capri	Ensinitas	27		61	82
22	Wiggin	S. D. Unified	28		50	72
	Totals		458	160	58%	80%

Table 5. Summary of Teacher Reaction Form Responses During Spring 1978 Tryout of The Captain Power Energy Education Program (18 teachers responding).

Part II

1. Approximately how many sessions were required to complete unit?

(most took 15 sessions)

Average length of each session:

(most took 30 minutes)

2. How many times did you show filmstrip?

3	one time
12	two times
3	three times

3. a. Which outcomes would you delete from program?

15	none
1	might eliminate #2
1	leave #4 as optional
1	would delete badges unless they agreed with current drawings

b. Which outcomes would you revise?

10	none
1	shorten some adventure stories
2	combine some of the more repetitious parts
1	color please!
2	revise a few items listed as nice-to-have to needed
1	more variety with picture cards
1	develop bingo game
1	more optional creative type activities
1	include solar power

c. Which additional outcomes should be included?

14	none
1	more info on fossil fuels
1	vocabulary lists
1	field trip suggestions
1	used lifesavers to show conservation--timed how long it took to eat one carelessly, then conservatively.

4. Did you inform each pupil of score on:

pretest?	14	yes	3	no	1	no response
posttest?	12	yes	4	no	2	no response

Table 5. (continued)

5. Did you receive any parent reactions re. program?

7 yes 11 no

Describe:

1 discussions begun by child on energy
1 being bugged about conservation
2 very favorable and cooperative
1 one negative reaction from scientist parent against governmental power
1 many lessons returned signed by parents

6. What was the overall reaction of class to program?

13 very positive 0 neutral
5 positive 0 negative

7. What is your overall reaction to program?

13 very positive 0 neutral
5 positive ____ negative

8. Additional comments, criticisms, or suggestions re. program:

4 none
4 additional filmstrips
1 more group activity
1 would like to teach program earlier in year
2 terrific unit!
1 include vocabulary list
1 children liked pictures to color
1 field trip ideas
1 more distinct background info in Teacher's Guide
2 stories could be more interesting
1 filmstrip could be more interesting
1 include card games for change of pace
1 materials really appealed to kids
1 I included creative writing activity with program

Lesson-Specific Comments:

Lesson 1: Pretest and Captain Power Filmstrip

1 great, even though some ideas didn't absorb
2 need additional screenings
4 children loved it
1 characters need to be more colorful, especially Capt. Power
2 really liked the drawings on filmstrip
1 beep on filmstrip too loud
2 some questions in Part A were too tricky
1 use grade-level vocabulary
1 tacky-looking Capt. Power
1 moved too fast
1 lesson took too long

Table 5. (Continued)

Lesson 2: Energy Distribution

1	more info on fossil fuels
1	more info on geothermal and nuclear energy
1	not as stimulating as other lessons
1	rather complicated
1	poor quality illustrations
1	kids loved it
1	outstanding
1	poster was well done
1	colored sources of energy

Lesson 3: Energy Concepts

1	more info on nuclear energy
1	need explanation of word "fossil"
1	showed filmstrip again
1	good reaction from parents
1	parent info was god
1	a lot of info to absorb at one time

Lesson 4: Energy Users

3	kids really liked it
1	well written
1	additional pictures needed
1	poster showing details of different electrical appliances would be good
1	student copies of each story would be beneficial

Lesson 5: Kinds of Energy

3	not many returned
2	really made them aware
2	pantomimes and riddles were fun
2	enjoyed cutting out pictures of energy users from magazines
1	not enough time
1	developed vocabulary and spelling activity with lesson
1	need pictures that illustrate electricity, natural gas, etc.--so kids can grasp symbols
1	kids enjoyed it
1	we expanded a lot on this lesson

Lesson 6: Energy Conservation

1	liked the Cost Poster
1	no time
1	habit check should have come sooner
1	small talk in beginning was stupid
1	"most of the time" is better than "always" as a choice

Lesson 7: Energy Costs

1	inadequate visual representation of home heater
1	additional cards would have been useful for games
2	excellent poster; easy to understand
1	good activity
1	had children draw one of the meters at their home

Table 5. (Continued)

Lesson 8: Energy Costs

1	chart really helped kids learn
1	combined this lesson with Lesson 7
1	discussed other energy users not shown and added to list
1	left poster in sight to help kindergarteners and first graders

Lesson 9: Needed Energy Users

1	new concept, but they got it
1	an easy definition of needed would have helped
1	kids suggested cars and ovens could be done without
1	class listed vacuum cleaner as needed and washing machine as nice to have because laundromats are available
1	school equipment could be listed as energy users
1	discussion of manual typewriters vs. electric could be conducted
1	needed and nice-to-have categories were unrealistic

Lesson 10: Needed Energy Users

1	combined this lesson with Lesson 9
1	optional part was confusing

Lesson 11: Energy Concepts

2	important to show filmstrip again
1	twice was enough for filmstrip
1	absorbed more this time
1	finished coloring energy distribution poster
1	had discussion
1	children's favorite lesson
1	Willy Wasteful concept should be developed further

Lesson 12: Energy Conservation

1	many had same answers twice
1	too soon to check again
1	not much change
1	good activity
1	a little long
1	made pinwheels to demonstrate wind power

Lesson 13: Learning from Pretest

1	not enough time
1	didn't have all pretests as some pupils had taken them home
1	some further creative lessons could be suggested

Lesson 14: Review

1	show filmstrip again
1	finished coloring energy users and other unfinished details
1	more creative lessons needed

Lesson 15: Posttest

2	kids had great scores
1	children enjoyed seeing their progress
1	more creative lessons needed
	children wrote stories, "If I had to live without power for a week"

Table 5. (Continued)

Comments from Class Record Sheets (20 teachers responding)

1. What was attitude of most pupils re. program?

13	very positive	____	neutral
6	positive	____	negative
	1 no response		

Comments:

5	kids really liked filmstrip
2	kids really enjoyed it
2	children were very interested
1	kids loved unit and so did I
1	no parent comments
1	pupils liked the coloring pages
1	children learned a great deal about energy

2. Comments, concerns, or suggestions re. program:

2	more info on fossil fuels
2	kids liked cost chart
2	kids liked big color poster
2	unit too drawn out and repetitive
2	additional Capt. Power filmstrips needed
2	would like to see vocabulary lists included
2	more color needed
1	filmstrip on meters
1	more info on crude oil
2	#1 on posttest is confusing
1	many missed #11 on posttest
1	all children seem to need program
1	simplify coloring pages so kids can use fat crayons in lines
1	lessons well thought out and easy to follow
1	beep on filmstrip too loud
1	more info and illustrations on gas/electric appliances
1	more info on nuclear energy
1	additional cards for games
1	more grade-level material
1	more suspense in Captain Power stories
1	larger envelope to mail pre and posttests
1	larger "How Energy Gets to Us" poster

3. Do you plan to use program again?

19 yes 1 no response

Comments:

1	children learned a lot
1	all children need this program
1	loved teaching it
1	would like higher level material
1	scores show it was a good unit
2	hope puppets will be available
1	materials are easily adapted to 3rd grade
2	excellent program
1	I plan to teach the unit next year for sure
1	I understand this is just for 2nd grade students

Table 6. Summary of Teacher Reaction Form Responses During Spring 1978 Tryout of The Power Quiz Energy Education Program (17 teachers responding).

Part II

1. Approximately how many sessions were required to complete unit?

(most took 15 sessions)

Average length of each session:

(most took 30-45 minutes per session)

2. How many times was filmstrip shown?

3	one time
13	two times
2	three times

3. a.Which program outcomes would you delete?

10	none
7	no response

b.Which program outcomes would you revise?

4	none
1	pricing
1	more comic books
1	had trouble relating cost to energy user in terms of dollars per year
1	would like more info such as "Transitional Storm"
9	no response

c.Which additional outcomes would you include?

1	more info on solar energy
1	more emphasis on needed and luxury items
1	include mural so slower kids could participate
14	no response

4. Did you inform pupils of scores on:

pretest?	13	yes	3	no	1	no response
posttest?	16	yes	0	no	1	no response

5. Did you receive any parent reactions re. program?

2	yes	14	no	1	no response

Describe:

1	pupils discussed program with parents
1	parents said program was good
1	students said they plan to continue conservation

Table 6. (Continued)

6. What was overall reaction of class to program?

8	very positive	1	neutral
8	positive	0	negative

7. What was your overall reaction to program?

13	very positive	1	neutral
3	positive	0	negative

8. Comments, criticisms, or suggestions re. program:

- 5 good unit
- 2 number student pages in teacher's manual
- 2 see comment sheet
- 1 too difficult to learn difference between low and very low energy users
- 1 info regarding how electricity is produced and alternative energy was most interesting
- 1 kids enjoyed Power Quiz
- 1 energy audit was a bit difficult
- 1 kids enjoyed energy comics
- 1 more experiments
- 1 more posters such as "Hidden Monster Hunt"

Lesson-Specific Comments

Lesson 1: Pretest and Introduction

- 1 it was good
- 1 needs excitement
- 1 some weren't interested in taking home

Lesson 2: Power Quiz Filmstrip

- 5 they loved it
- 3 not enough copies of comic book
- 1 took too long
- 1 went too fast
- 1 kids thought it was corny
- 1 not too much use

Lesson 3: Energy Concepts

- 1 reviewed vocabulary
- 1 kids loved to color in pages
- 1 no time
- 1 good program

Lesson 4: Energy Conservation

- 2 had trouble getting energy survey returned
- 2 children liked it
- 1 a lot of discussion
- 1 made chart to keep tally for teams
- 1 children wanted more

Table 6. (Continued)

Lesson 5: Needed Energy Users

2	rather difficult
1	it was fun
1	pupils had difficulty with needed concept
1	needed more time
1	interesting
1	kids did well

Lesson 6: Needed Energy Users

1	good program
1	a little difficult to shuffle cards, but kids watched

Lesson 7: Energy Costs

2	enjoyed it
1	needed more cards for work in small groups
1	children had trouble keeping categories straight
1	simply asked kids questions
1	lack of time
1	need large copy for bulletin board

Lesson 8: Energy Costs

2	found high and low energy bills
1	too difficult, but kids liked it when it was made a game
1	not enough time

Lesson 9: Sy Malone Filmstrip

3	excellent
2	enjoyed by all
1	most became aware of how much they needed in each category
1	a lot of terminology

Lesson 10: Energy Conservation

2	many didn't return audit
2	children enjoyed it
2	no time
1	need to send audit home 2 or 3 days before discussion
1	gave sleuth badges to those who returned audits
1	simply asked class questions

Lesson 11: Effective Conservation Practices

1	good list
1	discussed different ways to save water
1	difficult time of year to get group activities going
1	not enough time

Table 6. (Continued)

Lesson 12: Effective Conservation Practices

1	good discussion
1	class sensed no change in habits
1	were more honest this time

Lesson 13: Energy Concepts

2	they liked it
1	too lengthy

Lesson 14: Review

2	some questions were too hard
2	they liked it
1	good review
1	questioned #20

Lesson 15: Posttest

1	trying to get everyone at once

Comments from Class Record Sheets (22 teachers responding)

1. Attitude of most pupils toward program:

10	very positive	1	neutral
10	positive	1	negative

Comments:

2	end-of-school-year-rush affected attitude
1	parts were too easy--could go into more depth
1	most of class was very positive
1	didn't particulary like it
1	they enjoyed it very much
1	they were eager to work on program every day
1	they were reluctant to follow through with home projects

2. Comments, concerns, or suggestions re. program:

5	number student pages in teacher manual
3	more pages to color
2	lessons are of varying lengths
2	instruction should begin earlier in year
2	enjoyed filmstrips
1	ditto master for Power Quiz Script
1	"energy sleuth" sew-on patch
1	energy movie with real actors

Table 6. (Continued)

2. (continued)

1 "Instant-on" concept in energy audit not understandable
1 program too long--general idea of energy costs and conservation adequate at this age
1 not enough emphasis on energy production and alternative uses. This stimulated most interest
1 more experiments
1 cost chart not clear on electric appliance costs vs. gas
1 page 3--5 fingers on box 11?
1 page 25--3 eyes on sun?
1 class suggested lowering gas and electric bills

3. Do you plan to teach the program again?

18 yes 2 no 2 no response

Comments:
(Yes)

1 but I will not follow it exactly next time
1 looking forward to it!
1 definitely, please
1 want to do unit earlier in year
1 enjoyable--successful unit
1 other teachers also want program

(No)

1 will be on years leave of absence
1 will not be teaching 5th grade next year

Additional Suggestions from M. Eller

Suggested Vocabulary:

1. energy
2. foesil fuels
3. supplement
4. petroleum
5. conserve
6. crude oil
7. natural gas
8. hydroelectric
9. turbines
10. generators
11. nuclear power
12. nuclear reactor
13. nuclear
14. solar
15. tidal
16. geothermal
17. refinery
18. recover
19. coal
20. fusion
21. environment
22. consuming
23. kilowatt
24. therm
25. conservation
26. generate
27. reactor

Table 6. (Continued)

Additional Suggestions (continued)

Suggested Power Quiz Questions:

1. While producing energy from many sources, we must still preserve our environment. (T)
2. We're using up our fossil fuels and solar energy very rapidly. (F)
3. Heat from a nuclear reactor can create the steam to turn turbines. (T)
4. Tidal power in all areas can be used to generate energy. (F)
5. Electricity can be stored in batteries. (T)
6. Hot fluids deep within the earth create steam. (T)
7. We all need to support the development of additional energy sources. (T)
8. Everyone needs to help conserve all forms of energy. (T)

1. Coal can be used for heating homes. (T)
2. Crude oil is pumped directly to homes. (F)
3. Oil can be made into fertilizer, plastics, and clothing. (T)
4. Fuel is used to heat water to create steam to generate electricity. (T)
5. Nuclear power was the first energy harnessed by man. (F)
6. In the past, we moved from one type of fuel to another because we discovered something better. (T)
7. The United States has the largest population of any country. (F)
8. Using up our limited supply of oil and natural gas means we need to use other sources of energy. (T)

Item Analysis from Spring Tryout -1978
(% correct)

CAPTAIN POWER ENERGY EDUCATION PROGRAM: PRETEST

Total $\bar{x}$ = 62%

Name _____

A For each question below, listen as it is read aloud.
Then answer the question by drawing a circle around (Yes) or (No).

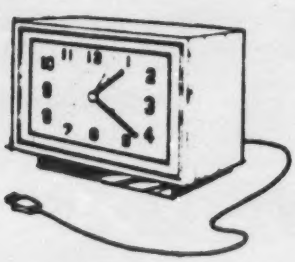
1.	Can energy be used to make things cold?	(Yes)	No	72%
2.	Does the water company send cold water and hot water to our homes?	Yes	(No)	16%
3.	Are natural gas and gasoline the same thing?	Yes	(No)	76%
4.	Will most of our energy in the future come from oil and natural gas?	Yes	(No)	36%
5.	By "fossil fuels," do we mean oil, electricity, and natural gas?	Yes	(No)	40%
6.	Can water be used to help make electricity?	(Yes)	No	64%
7.	Do most families spend more money for electricity and natural gas than for food?	Yes	(No)	28%
8.	Is more and more energy used every year?	(Yes)	No	100%
9.	Do children use electricity and natural gas?	(Yes)	No	48%
10.	Is there a natural gas meter at most of our homes?	(Yes)	No	76%
11.	Do electric companies use lots of oil?	(Yes)	No	52%
12.	Once each year, do the water and power companies send bills to our homes?	Yes	(No)	28%

$\bar{x}$ = 53%

B For each picture, mark ☒ the box under the symbol for the kind or kinds of energy it often uses.

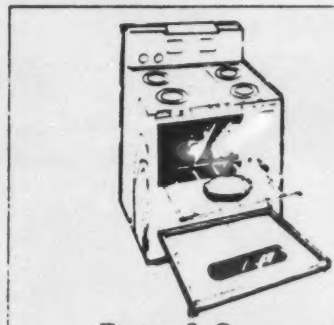
Here is what each symbol means:

gasoline	electricity	natural gas	electricity or natural gas



Clock

20% 13. ☐ ☒ ☐ ☐



Range & Oven

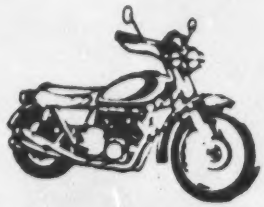
52% 14. ☐ ☐ ☐ ☒

Fluorescent Light

88% 15. ☐ ☒ ☐ ☐

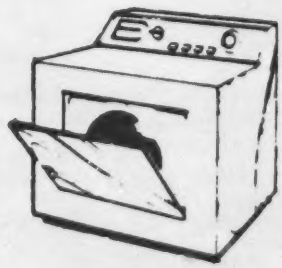
Water Heater

28% 16. ☐ ☐ ☐ ☒



Motorcycle

96% 17. ☒ ☐ ☐ ☐

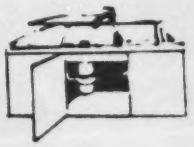
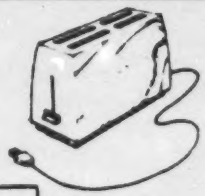
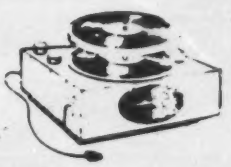
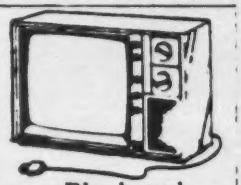
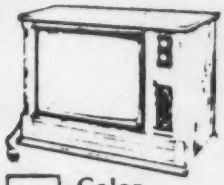
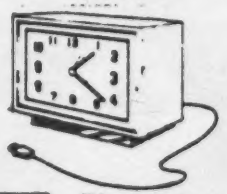
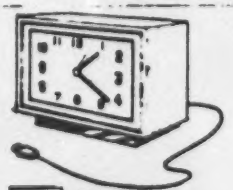
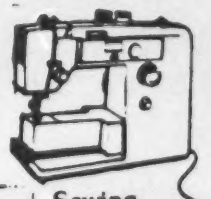


Clothes Dryer

36% 18. ☐ ☐ ☐ ☒

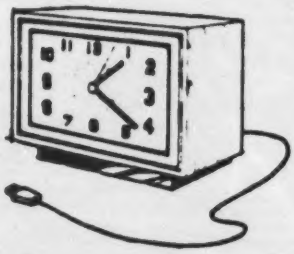
$\bar{x}$ = 67%

C In each row, mark ☒ the box under the energy user that costs the most to operate during a year's time in most homes. Mark only *one* box in each row.

72%	19.	☒ Range & Oven	☐ Vacuum Cleaner	☐ Hair Dryer	 ☐ Garbage Disposal
88%	20.	 ☐ Toaster	☐ Electric Toothbrush	 ☐ Record Player	 ☒ Black and White Television
52%	21.	☐ Radio	☒ Water Heater	☐ Electric Blanket	☐ Washing Machine
32%	22.	 ☐ Color Television	☐ Dishwasher	☐ Washing Machine	☒ Home Lights
48%	23.	☒ Home Heater	☐ Clothes Dryer	☐ Range & Oven	 ☐ Electric Clock
84%	24.	☐	 ☐ Electric Clock	☒ Dishwasher	 ☐ Sewing Machine

$\bar{x}$ = 63%

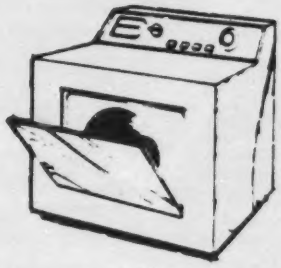
D Mark ☒ the box under each picture that tells how much that energy user is needed by most families.



Electric Clock

76%

25. ☐ Needed
☒ Nice-to-Have



Clothes Dryer

48%

26. ☐ Needed
☒ Nice-to-Have

Washing Machine

76%

27. ☒ Needed
☐ Nice-to-Have

Water Heater

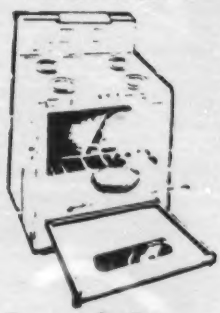
88%

28. ☒ Needed
☐ Nice-to-Have

Vacuum Cleaner

72%

29. ☐ Needed
☒ Nice-to-Have



Range & Oven

88%

30. ☒ Needed
☐ Nice-to-Have

$\bar{x} = 75\%$

Item Analysis from Spring Tryout -1978 (% correct)

CAPTAIN POWER ENERGY EDUCATION PROGRAM: POSTTEST

Total $\bar{x}$ = 90%

Name _____

A For each question below, listen as it is read aloud. Then answer the question by drawing a circle around (Yes) or (No).

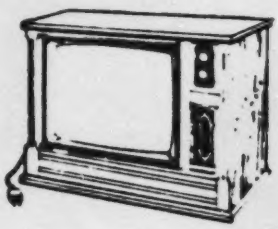
1.	Is electricity needed for you to have ice cream?	(Yes)	No	84%
2.	Is gasoline made from electricity?	Yes	(No)	96%
3.	Is natural gas free?	Yes	(No)	100%
4.	Do we have enough fossil fuels to last forever?	Yes	(No)	100%
5.	Is energy used to get water to our homes?	(Yes)	No	96%
6.	Is natural gas sent to our homes through underground pipes?	(Yes)	No	84%
7.	Are meter readers persons who give parking tickets?	Yes	(No)	92%
8.	Will we use other kinds of energy in the future besides oil and natural gas?	(Yes)	No	100%
9.	Does taking a long shower waste energy?	(Yes)	No	96%
10.	Are natural gas and gasoline the only two kinds of energy that our families use a lot?	Yes	(No)	72%
11.	Is a power company like a newspaper business in some ways?	(Yes)	No	76%
12.	Does every family pay the same amount of money for electricity each month?	Yes	(No)	92%

$\bar{x}$ = 91%

B For each picture, mark ☒ the box under the symbol for the kind or kinds of energy it often uses.

Here is what each symbol means:

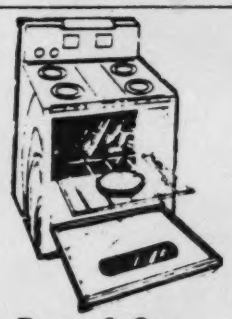
gasoline	electricity	natural gas	electricity or natural gas



Television

72%

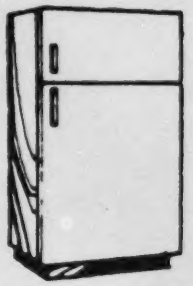
13. ☐ ☒ ☐ ☐



Range & Oven

96%

14. ☐ ☐ ☐ ☒



Refrigerator

84%

15. ☐ ☒ ☐ ☐

Home Heater

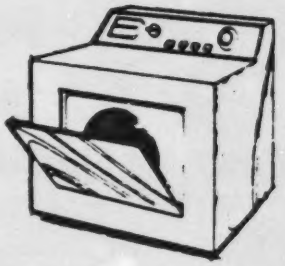
72%

16. ☐ ☐ ☐ ☒

Car

96%

17. ☒ ☐ ☐ ☐



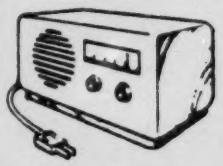
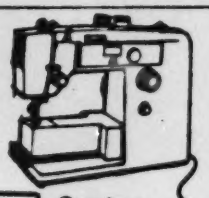
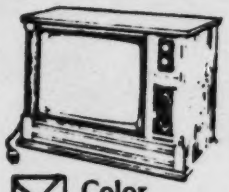
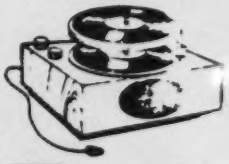
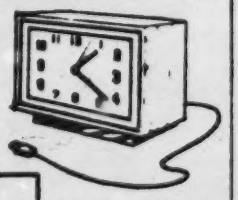
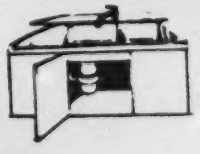
Clothes Dryer

60%

18. ☐ ☐ ☐ ☒

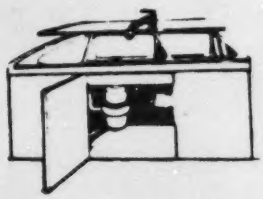
$\bar{x}$ = 83%

C In each row, mark ☒ the box under the energy user that costs the most to operate during a year's time in most homes. Mark only *one* box in each row.

76% 19.	☐ Clothes Dryer	☒ Home Heater	 ☐ Radio	☐ Washing Machine
100% 20.	☐ Electric Toothbrush	 ☐ Sewing Machine	 ☒ Color Television	☐ Toaster
100% 21.	☒ Water Heater	☐ Iron	☐ Radio	☐ Hair Dryer
96% 22.	☐ Electric Carving Knife	☐ Washing Machine	☒ Car	☐ Clothes Dryer
92% 23.	☒ Refrigerator	 ☐ Record Player	☐ Hair Dryer	☐ Dishwasher
92% 24.	☐ Vacuum Cleaner	☒ Range & Oven	 ☐ Electric Clock	 ☐ Garbage Disposal

$\bar{x}$ = 93%

D Mark ☒ the box under each picture that tells how much that energy user is needed by most families.



Garbage Disposal

34%

25. ☐ Needed
☒ Nice-to-Have

Electric Mixer

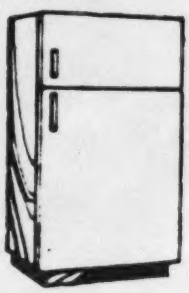
96%

26. ☐ Needed
☒ Nice-to-Have

Home Heater

72%

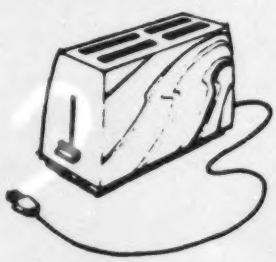
27. ☒ Needed
☐ Nice-to-Have



Refrigerator

92%

28. ☒ Needed
☐ Nice-to-Have



Toaster

100%

29. ☐ Needed
☒ Nice-to-Have

Car

100%

30. ☒ Needed
☐ Nice-to-Have

$\bar{X} = 91\%$

Item Analysis from Spring Tryout - 1978
(% correct)

THE POWER QUIZ ENERGY EDUCATION PROGRAM: PRETEST

Total $\bar{X}$ = 53%

Name _____

A Read each sentence below. Circle (True) or (False).

1.	Most of today's energy comes from nuclear power.	True	(False)	44%
2.	Electricity is a fossil fuel.	True	(False)	60%
3.	Fertilizer can be made from oil.	(True)	False	20%
4.	The United States uses about one-third of the world's available energy.	(True)	False	72%
5.	Our supply of underground fossil fuels is unlimited.	True	(False)	76%
6.	There will probably be less electricity available in the future.	True	(False)	8%
7.	We can produce energy for less money today than ten years ago.	True	(False)	60%
8.	The ocean tides can be used to produce electricity.	(True)	False	60%
9.	Geothermal energy uses hot liquids from deep in the earth.	(True)	False	68%
10.	Children use energy too.	(True)	False	96%
11.	Conservation will solve all of our energy problems.	True	(False)	68%
12.	Taking a long hot shower wastes energy.	(True)	False	88%

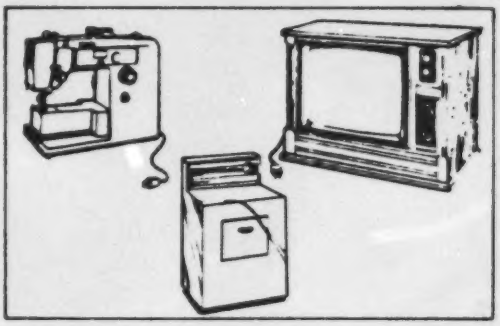
$\bar{X}$ = 60%

B Look at each group of three energy users below.
Mark ☒ the energy user that the typical family needs the most.
Mark only one in each group.

13.

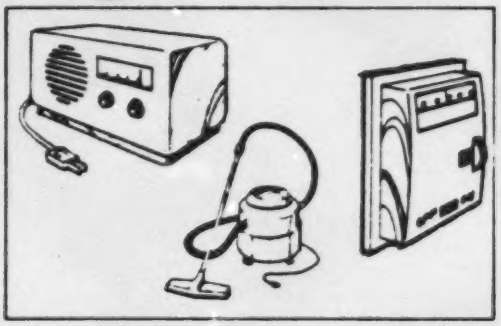
96%
- ☐ Iron
- ☒ Water Heater
- ☐ Clothes Dryer

14.



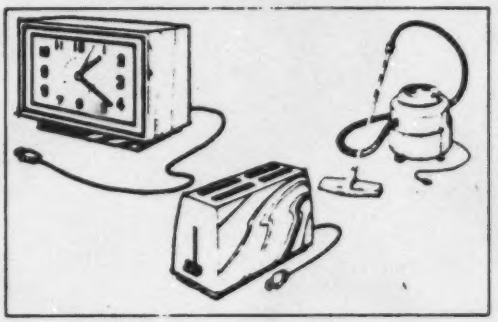
56%
- ☒ Washing Machine
- ☐ Television
- ☐ Sewing Machine

15.



84%
- ☐ Radio
- ☒ Home Heater
- ☐ Vacuum Cleaner

16.

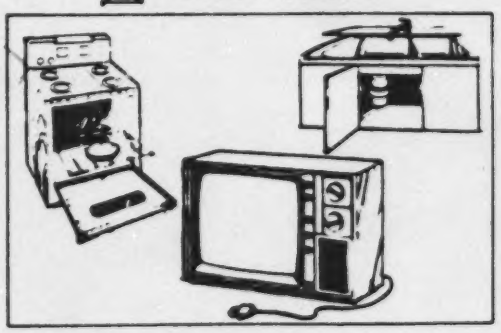


24%
- ☐ Toaster
- ☐ Electric Clock
- ☒ Vacuum Cleaner

17.

84%
- ☒ Home Lights
- ☐ Record Player
- ☐ Dishwasher

18.



68%
- ☐ Garbage Disposal
- ☒ Range & Oven
- ☐ Television

$\bar{x} = 69\%$

C Look at each energy user below. Mark ☒ the box under the cost range that best describes how much money it takes to operate that energy user each year. Choose the cost based on an average family's use during a year's time.

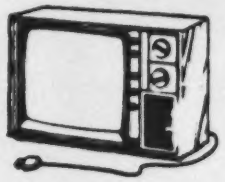
Yearly Cost			
Very Low: Less than $1	Low: $1-$9	Medium: $10-$50	High: More than $50

20%

19. Home Lights

Very Low ☐ Low ☐ Medium ☐ High ☒

44%



20. Black & White Television

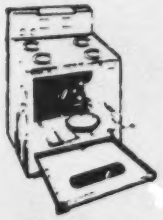
Very Low ☐ Low ☐ Medium ☒ High ☐

36%

21. Gas Home Heater

Very Low ☐ Low ☐ Medium ☐ High ☒

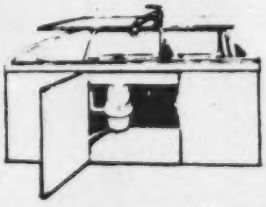
40%



22. Electric Range & Oven

Very Low ☐ Low ☐ Medium ☒ High ☐

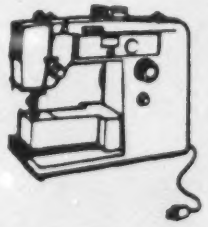
40%



23. Garbage Disposal

Very Low ☐ Low ☒ Medium ☐ High ☐

20%



24. Sewing Machine

Very Low ☒ Low ☐ Medium ☐ High ☐

$\bar{x} = 35\%$

D Look at each group of conservation practices below. Mark ☒ the energy conservation practice in each group that would save the most money on energy for most families during a year's time.

25. ☐ Use a regular toothbrush instead of an electric toothbrush.
56% ☒ Set water heater temperature at "medium" instead of "high."
☐ Let hot foods cool before putting in refrigerator.

26. ☐ Don't use an electric hair dryer.
24% ☐ Turn off the tv and radio when not in use.
☒ Close heater vents in unused rooms.

27. ☐ Use a hand-operated can opener instead of an electric can opener.
28% ☐ Wash only full loads in the dishwasher and washing machine.
☒ Set home heater thermostat at 65° in daytime, 55° at bedtime.

28. ☒ Take short showers and shallow baths.
56% ☐ Turn off the water while brushing teeth.
☐ Keep pots and pans covered while cooking.

29. ☐ Use broom, not water hose, to clean off driveways and sidewalks.
28% ☐ Open and close refrigerator quickly.
☒ Use the family car only when necessary.

30. ☐ Use wind-up clocks instead of electric clocks.
56% ☒ Wash only full loads in the dishwasher and washing machine.
☐ Wear clothes that do not need ironing.

$\bar{x}$ = 41%

Item Analysis from Spring Tryout -1978
(% correct)

THE POWER QUIZ ENERGY EDUCATION PROGRAM: POST TEST

Total $\bar{x}$ = 80%

Name _____

A Read each sentence below. Circle (True) or (False).

1.	Very little of today's energy comes from fossil fuels.	True	(False)	76%
2.	Natural gas is a fossil fuel.	(True)	False	88%
3.	A lot of oil is burned by electric companies to produce electricity.	(True)	False	56%
4.	Since 1900 the use of electricity in the United States has doubled every twenty-five years.	True	(False)	56%
5.	Much of the world's known supply of fossil fuels has been used up.	(True)	False	80%
6.	We have more coal than oil left.	(True)	False	84%
7.	Our limited supply of oil and natural gas means that we will have less energy available in the future.	True	(False)	36%
8.	Geothermal energy produces most of our electricity today.	True	(False)	64%
9.	Future energy sources are costing us money today.	(True)	False	92%
10.	Conserving fossil fuels will help give scientists time to develop new energy sources.	(True)	False	84%
11.	Girls and boys your age can do very little to help save energy.	True	(False)	72%
12.	A dripping faucet wastes water, but not energy.	True	(False)	92%

$\bar{x}$ = 73%

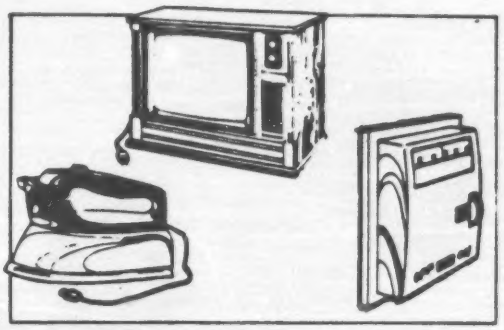
B Look at each group of three energy users below. Mark ☒ the energy user that the typical family needs the most. Mark only one in each group.

13.

100%

- ☐ Clothes Dryer
- ☐ Electric Mixer
- ☒ Water Heater

14.



100%

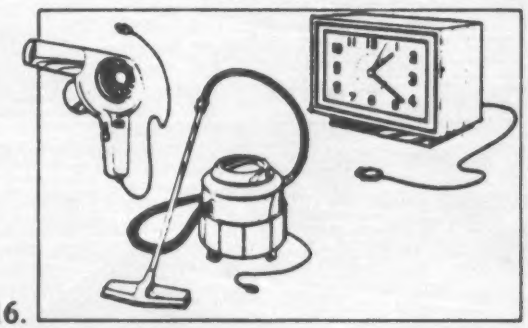
- ☐ Iron
- ☒ Home Heater
- ☐ Television

15.

100%

- ☒ Range & Oven
- ☐ Record Player
- ☐ Garbage Disposal

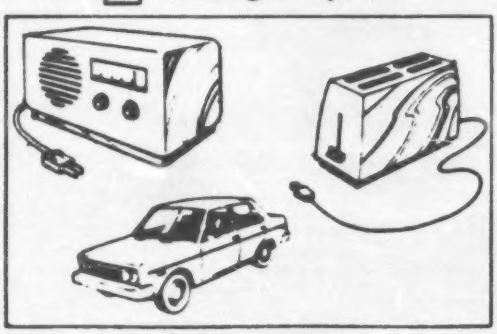
16.



68%

- ☐ Electric Clock
- ☐ Hair Dryer
- ☒ Vacuum Cleaner

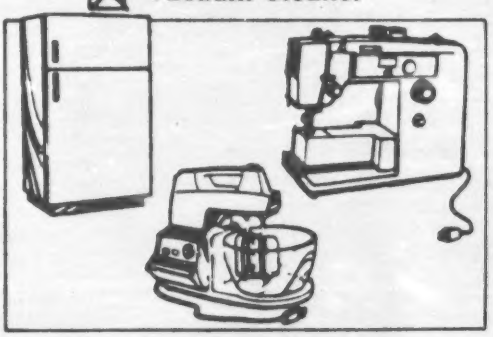
17.



100%

- ☐ Radio
- ☐ Toaster
- ☒ Family Car

18.



100%

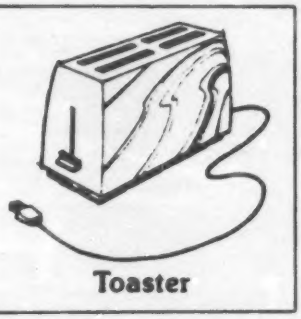
- ☒ Refrigerator
- ☐ Sewing Machine
- ☐ Electric Mixer

$\bar{X}$ = 95%

C Look at each energy user below. Mark ☒ the box under the cost range that best describes how much money it takes to operate that energy user each year. Choose the cost based on an average family's use during a year's time.

Yearly Cost			
Very Low: Less than $1	Low: $1-$9	Medium: $10-$50	High: More than $50

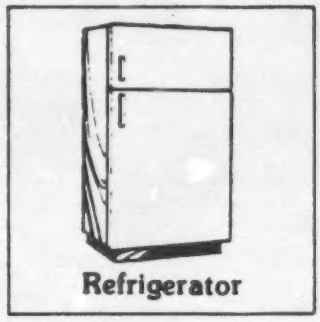
88%



19. Toaster

Very Low ☐ Low ☒ Medium ☐ High ☐

48%



20. Refrigerator

Very Low ☐ Low ☐ Medium ☐ High ☒

88%

21. Gas Range & Oven

Very Low ☐ Low ☐ Medium ☒ High ☐

28%

22. Electric Mixer

Very Low ☒ Low ☐ Medium ☐ High ☐

100%

23. Family Car

Very Low ☐ Low ☐ Medium ☐ High ☒

96%

24. Electric Clothes Dryer

Very Low ☐ Low ☐ Medium ☒ High ☐

$\bar{x}$ = 75%

D Look at each group of conservation practices below. Mark ☒ the energy conservation practice in each group that would save the most money on energy for most families during a year's time.

25. ☒ Take short showers and shallow baths.
56% ☐ Use a regular blanket instead of an electric blanket.
☐ Keep refrigerator free of frost and set at proper temperature.

26. ☒ Use the family car only when necessary.
88% ☐ Open and close refrigerator door quickly.
☐ Hang clothes out to dry when weather is nice.

27. ☒ Close drapes and windows when heat is on.
52% ☐ Let hot foods cool before putting them in the refrigerator.
☐ Put food waste in trash can instead of using garbage disposal.

28. ☐ Wear clothes that do not need ironing.
96% ☒ Turn off all unnecessary lights when not in use.
☐ Use a hand-operated can opener instead of an electric can opener.

29. ☐ Use a regular toothbrush instead of an electric toothbrush.
92% ☒ Set home heater thermostat at 65° in daytime, 55° at bedtime.
☐ Turn off the tv and radio when not in use.

30. ☐ Keep oven door closed while food is cooking.
92% ☐ Turn off water while brushing teeth.
☒ Set water heater temperature at "medium" instead of "high."

$\bar{x} = 79\%$

Percent of Pupils in Five Classes Responding Positively to Each Item

San Diego Area Energy Education Programs — Fall 1977 Field Test

PUPIL REACTION FORM--PRIMARY LEVEL

Listen as each question below is read aloud. Then answer the question by drawing a circle around Yes or No.

96%	(Yes)	No	1. Did you like learning about energy during the last two weeks?
100%	(Yes)	No	2. Do you think you learned a lot of important things about energy?
96%	(Yes)	No	3. Do you think the "Captain Power" filmstrip was good?
86%	(Yes)	No	4. Did you like doing the energy practice exercises?
94%	Yes	(No)	5. Do you think the energy practice exercises were too hard?
92%	(Yes)	No	6. Did you like talking about energy with your parents at home?
90%	(Yes)	No	7. Did you like taking the energy pretest?
96%	(Yes)	No	8. Did you like taking the energy posttest?

Summary of Pupil Responses from Four Classes

San Diego Area Energy Education Programs — Fall 1977 Field Test

PUPIL REACTION FORM--INTERMEDIATE LEVEL

Mark your answers with a check (✓). Your answers will help us change the program and try to make it better. Please tell us exactly what you think.

NOTE- Program was substantially revised, and all meter reading activities were deleted F/W 1/79

1. What grade are you in?

13% third grade	35% fifth grade
20% fourth grade	32% sixth grade

2. Check how much you liked each of the activities listed below:

	I liked this a lot	I liked this OK	I did not like this	I did not do this	no response
a. taking the pretest	5%	78%	15%	2%	
b. watching "Power Quiz"	65%	35%	—	—	
c. talking about "Power Quiz"	20%	65%	15%	—	
d. answering true/false questions	20%	63%	17%	—	
e. doing the Home Energy Survey at home	15%	43%	23%	17%	2%
f. learning how to read meters	53%	33%	12%	2%	
g. reading meters and keeping graphs at home	23%	25%	30%	22%	
h. watching "Sy Malone, Energy Sleuth"	78%	10%	5%	7%	
i. deciding which energy users we need the most	23%	57%	20%	—	
j. deciding which energy users cost the most money every year	13%	52%	33%	2%	
k. deciding which kinds of things are most important for us to do	28%	65%	7%	—	
l. doing the Hidden Word Game	50%	18%	5%	27%	
m. checking energy habits at home	18%	55%	15%	12%	
n. doing the Energy Audit Sheets at home	15%	53%	20%	10%	2%
o. taking the posttest	25%	40%	30%	5%	

3. Besides the things listed in the last question (Number 2), were there any other things that you <u>really liked</u> about studying energy? (Don't worry about spelling.)

4. Were there any other things you did <u>not</u> like?

5. How hard or how easy was it for you to do the energy program?

2% too hard 88% about right 5% too easy 5% no response

6. Check which, if any, of the meters below you actually read at home each day and recorded on the chart <u>for at least one week</u>.

35% my home electric meter 23% natural gas meter 35% water meter 7% no respon

7. How much did you talk about energy and the take-home exercises with your parents and family?

25% a lot 15% not very much
35% some 20% not at all 5% no response

8. <u>Before</u> you did this energy program, how watchful were you about saving energy and water?

30% very watchful 43% sort of watchful 22% not very watchful 5% no respons

9. Do you think you learned a lot of important things about energy during the past three weeks?

90% yes 5% no 5% no response

10. How much better do you think you will do in saving energy and water <u>now</u> than you did before the program?

38% much better 35% better 20% about the same 7% no response

11. Write down any ideas you have about how we could change the energy program to make it better or more fun.

Pupil Comments -- Intermediate Program

Item 3. Were there any other things that you really liked about studying energy?

"I really liked completing the graphs in the workbook."

"reading meters."

"I really liked learning to read meters with the plastic clock."

"The hidden word game."

"I liked learning things about tidal power."

"The people in Power Quiz and on the Energy Booklet."

"I liked doing everything."

"The people coming from S.D.G.E."

"I liked learning about energy."

"The best thing I like about studying energy was the films."

"Talking about nuclear energy"

"I liked to learn about how much energy we are using."

"Yes, when the people came and asked for our opinions about the film."

"Graphing"

"The slide shows"

"Reading meters"

"I liked the meters."

"Yes, doing the energy booklet. It taught me a lot about energy."

"The hidden word game"

"Finishing the program"

"Watching Sy Malone Energy Sleuth. Graphs."

"Telling other people and spreading the word"

Pupil Comments -- Intermediate Program

Item 4. Were there any other things you did not like about studying energy?

"Yes! Graphing meters."

"Yes, everything."

"Graphing it"

"Yes, the opinions questions."

"Yes, the questions on your own opinions."

"Yes! Graphing meters."

"Pretest. Posttest."

"The pre-test"

"You putting our answers in the book."

"No, there was not."

"Yes, the book was not put together."

"I didn't like take home exercises."

"The questions about which would do the best for everyone"

"The Energy Audit Sheets! (too many to take home!)"

"The book was all messed up."

"Yes, the booklet was not put together right."

"Taking things home to do"

"Yes the booklet I did not like."

"Too many goofs "

"The booklet was put together crazy and the questions were crazy."

"The book was all messed up"

"You made Miss Hobeaker mess up thanks to you."

"Whoever put the booklet together got me confused "

"I did not like the graphs in the book."

"I did not like the way the book was made."

"No. But there is one little thing. Book was all mixed up "

"No I liked it pretty much."

"No not a thing."

Pupil Comments -- Intermediate Program

Item 4. (continued)

"I didn't like the Graphing"

"how to make graphs and cubic feet"

"no, except, just learning to read meters, that was hard."

"not really"

"not really"

"No! (not that I can think of)"

Pupil Comments--Intermediate Program

Item 11. Write down any ideas you have about how we could change the energy program to make it better or more fun.

"You should have more reading meters exercises and more films."

"Put more puzzles in it"

"Have more puzzles."

"I don't know. I like it a lot it's neat"

"make more films"

"more Sy Malone films, those are good learning films and fun to watch"

"To have a few more film strips"

"Have more movies"

"To talk about more things."

"I do not have any ideas "

"Change the booklet!!!"

"More movies with the people from Power Quiz"

"have more film"

"I can't think of anything right!!! But I will."

"I think you should put more things about tidal power in it."

"Have a couple of more films."

"You can do a crossword puzzle and a blank piece of paper and ask to draw a picture of an energy sloth."

"have more slides"

"make it not mixed up"

"have more games about energy"

"I think it would be fun if we had a cartoon once a week about Sy Malone"

"Make the book so that you can read the numbers"

"I think that you could make more films or slides. But it was very good"

"do not make goofs and make us mad!!!!"

"doing more puzzles."

Pupil Comments -- Intermediate Program

Item 11 (continued)

"To have the booklets printed right."

"There is none"

"Change the book or everybody is going to write some very bad letters."

"Just some more fun things."

"Don't have so many Energy Audit Sheets! (Too much trouble!)"

"Yes. Put the booklet in the right order next time."

"Have more Films. And have less sheets"

"Have a page to color in it. Have it put together right"

"Don't make mistakes because you made too many in the booklet we did. Do it right next time."

"More meter readings in the book."

"Make the energy program a little longer and make more energy games."

"Make more take home Graphs"

"I don't have any ideas."

"Dot to Dots. Mazes."

"Make a game out of it"

"that the opinions do not have answers! It makes me mad"

"Use Solar panels instead of the other junk. P.S. I don't care if it cost $10,000,000,000 bucks."

"Yes, change the Energy booklet, Put some more games in."

"Don't have any"

"Yes. Change the opinions. Let us make the decisions not the teacher's guide."

"I have no ideas."

"The teachers will tell you."

"Show how to read meters. Give us more time to study."

"More graphing"

"more math games"

"Don't put our opinions in the answer book"

"More films, less work pages."

Summary of Responses from Five Primary Classes

San Diego Area Energy Education Programs — Fall 1977 Field Test

PARENT REACTION SHEET

The San Diego Area Energy Education Programs are being developed jointly by a task force of teachers, curriculum consultants, program development specialists, and the San Diego Gas & Electric Company. Your child's class is one of several that have just completed the two- to three-week instructional programs as part of an initial field test. The results of this field test, including your comments on this Parent Reaction Sheet, will be used to revise and improve the programs before they are made available at no cost to the other classes in our area.

Please take a few minutes to answer the questions below. Then send the completed reaction sheet back to school with your child within the next two days. Thank you very much.

1. What grade is your child in?

4% first ___ third ___ fifth ___ other (_____)
9% second ___ fourth ___ sixth

2. Do you still have your copy of the parent information leaflet that begins, "You're about to become the proud parent of....an energy expert!"

56% yes 36% no 4% did not receive 4% no response

If "yes," please look at the leaflet again and list below any comments, criticisms, and suggestions that will help us evaluate and revise both the leaflet and the materials and procedures referred to in the leaflet.

Leaflet Section	Your Comments, Criticisms, and Suggestions
Why energy education?	See attached
There's a lot to learn	
How you can help	

3. How many of the activities listed under "How you can help" in the parent leaflet did you actually complete with your child?

8% all of the activities
20% most of the activities
32% about half of the activities
24% few or none of the activities
16% no response

4. Did you complete the "Energy Audit of Your Home?"

80% yes 8% no 8% did not receive 4% no response

Should this energy audit be kept as a part of the program in the future?

80% yes ___ no 20% no response

Comments and suggestions:

see attached

5. How useful was the information in the following pamphlets that were sent home?

a. "How to Read Your Gas & Electric Bill"

76% useful--keep in program 4% not useful--take out of program 4% did not receive 16% no response

b. "43 Ways to Cut Energy Consumption"

84% useful--keep in program ___ not useful--take out of program 4% did not receive 12% no response

6. What do you feel was your child's overall attitude about the energy program?

44% liked it very much 40% liked it 16% neutral ___ didn't like it

7. Do you feel that the energy program was a worthwhile learning experience for your child?

92% yes 4% no 4% no response

8. Please give us any other comments or suggestions about any aspect of the program that might help us evaluate and improve the program. Thank you again!

see attached

Number of Reaction Sheets Returned:

Banner	9
Buell	4
Green	12
Hathaway	10
Hobson	10
	45

Parent Comments on Parent Reaction Sheets --Primary

"I felt it was a very positive approach to saving energy. My grandmother fussed at me as a child to turn off lights, but my son's reaction now after what he has learned is sharing a common goal towards the future. He even remembers to turn the T.V. off now!!"

"I hope this program can be expanded. It will (or can) help children realize that sometimes quality can win over quantity."

"If child can learn the value of energy conservation now it becomes part of their way of life."

"The only suggestion I have is to do the same for water conservation--in more detail."

"My daughter has learned quite a bit about energy saving and reminds me about turning off lights, water, and closing the refrigerator door. Also about the pollution conditions."

"Too technical for second graders. I think that just the general concepts need be taught. For example, 5 minute showers, turning off lights, keeping thermostats low in winter, high in summer, etc."

"Please keep it up. I think it's very helpful."

"My child has been very "energy saving" conscious."

"Katie learned alot and also reminded us of our failings."

"Some of the yes/no questions seemed to have ambiguous answers; it wasn't clear to me whether children were being told that we are running out of certain energy sources, or are not. On the whole, I liked idea of getting children to think in terms of energy priorities."

"The program seems to accomplish its purpose. Making children and adults more aware of the energy we use and may be wasting, not realizing it."

Parent Comments (Primary)

"I would like to receive the "43 ways to cut consumption." We are trying very hard to conserve. We've had SDG&E out twice to help us with our home. Plus they send us helpful information on how to conserve."

"I think the vocabulary and information were too advanced for a second grader."

"Much of it was too difficult for younger children."

"Last year our 7th grade daughter wrote to the gov't for a variety of pamphlets. Among these were "My Energy Book by Energy Ant" and Energy Activities with Energy Ant" (Federal Energy Administration FEA-357-A and FEA 1A-76/205). The pamphlets were colorful and written for the elementary school age child (grades kindergarten through 3rd grade)--Our daughter enjoyed these. It's difficult to teach adults and change their bad habits but our children if reached at a young age can improve on our mistakes. Thanks for your efforts."

"Simplify the Energy Audit so that child can check on more home situations. For example, he didn't know what insulation was. We had to redefine terms or restate questions many times."

"I think everything in the leaflets was great, and I think the program should be kept up."

"Like it or not, most of us have several, if not many, wasteful energy habits. Good learning experience for all of us We are much more aware and headed in the right "conserving" direction, I hope."

"I think the leaflet and energy saving suggestions were complete."

"The wording of some questions (on the Energy Audit of Your Home) was a bit complicated. A negative response on a few questions meant yes--which was confusing."

"I'm sorry I didn't keep the leaflets and read them. I approve of the program. I feel awareness is the first step in conquering problems."

"I think teaching the children with energy programs is a lot better because I have experienced it ourselves when we stop our children not to leave the lights on or getting something in the refrigerator they let the door open too long."

"I found your leaflet very informative and I am going to try and help Gilbert be more conscious of saving energy and water."

"My child has become very aware of the energy problem and is a great help at home."

Summary of Parent Reactions from three classes - Intermediate Program

San Diego Area Energy Education Programs — Fall 1977 Field Test

PARENT REACTION SHEET

The San Diego Area Energy Education Programs are being developed jointly by a task force of teachers, curriculum consultants, program development specialists, and the San Diego Gas & Electric Company. Your child's class is one of several that have just completed the two- to three-week instructional programs as part of an initial field test. The results of this field test, including your comments on this Parent Reaction Sheet, will be used to revise and improve the programs before they are made available at no cost to the other classes in our area.

Please take a few minutes to answer the questions below. Then send the completed reaction sheet back to school with your child within the next two days. Thank you very much.

1. What grade is your child in?

___ first ___ third 60% fifth ___ other (_____)
___ second ___ fourth 40% sixth

2. Do you still have your copy of the parent information leaflet that begins, "You're about to become the proud parent of....an energy expert?"

55% yes 30% no 15% did not receive

If "yes," please look at the leaflet again and list below any comments, criticisms, and suggestions that will help us evaluate and revise both the leaflet and the materials and procedures referred to in the leaflet.

Leaflet Section	Your Comments, Criticisms, and Suggestions
Why energy education?	(see attached)
There's a lot to learn	
How you can help	

3. How many of the activities listed under "How you can help" in the parent leaflet did you actually complete with your child?

15% all of the activities
35% most of the activities
15% about half of the activities
25% few or none of the activities
10% no response

4. Did you complete the "Energy Audit of Your Home?"

70% yes 25% no 5% did not receive

Should this energy audit be kept as a part of the program in the future?

95% yes ___ no 5% no response

Comments and suggestions:

(see attached)

5. How useful was the information in the following pamphlets that were sent home?

a. "How to Read Your Gas & Electric Bill"

90% useful--keep in program 5% not useful--take out of program 5% did not receive

b. "43 Ways to Cut Energy Consumption"

90% useful--keep in program ___ not useful--take out of program 10% did not receive

6. What do you feel was your child's overall attitude about the energy program?

40% liked it very much 45% liked it 15% neutral ___ didn't like it

7. Do you feel that the energy program was a worthwhile learning experience for your child?

100% yes ___ no

8. Please give us any other comments or suggestions about any aspect of the program that might help us evaluate and improve the program. Thank you again!

(see attached)

Parent Reaction Sheets Returned:

Dotinga	13	
Fuller	0	(did not send sheets home)
Hobecker	18	
Swenson (ill)	0	(ill--did not return material)
Yeroshek	4	
	35	

Parent Reactions - Intermediate Program

Item 2. Comments, Criticisms, and Suggestions on parent information leaflet sections:

Why energy education?

"Made my son aware of the need for energy conservation."

"None. Excellent as is."

"Well-written."

There's a lot to learn

"Made all of us aware of wasteful energy habits--ours and others."

"This was an excellent section and gave a good ideal of what was to come."

"Very cleverly written and informative."

How you can help

"The suggestions were good--some I had not thought of."

"Especially good."

"Good energy suggestions in this section."

"Some very practical suggestions."

Item 8. Comments or suggestions about any aspect of the program:

"Bobby's Dad worked with Bobby on this project. Bobby was very enthusiastic about it."

"The program really made my son more aware of turning off lights, TV, and stereo when not in actual use. He, in turn, made the rest of the family more aware of wasteful practices."

"It could be dangerous for children to keep a record of the amount of water used as the cover on the water meter box is heavy and a special tool is needed to open it. We did not have a tool to lift the cover so did not record our water use."

"This was an excellent program. It was enjoyed by the child and his parent. Well done."

"We have all (meaning both Ray and Guy and I) been aware of energy (to save money) and as the boys both cook, they are aware of fuel sources for what appliances. Since I feel children are full participators in family and its functions, saving energy and money are very important."

Parent Reactions--Intermediate program

Item 8 (continued)

"Evidently more emphasis should be place on the distribution of the leaflet."

"I don't wish to do homework with my child. I have had to use a lot of these suggestions just to keep our energy costs down. Energy conservation is important until we are intelligent enough to use solar energy."

"Great as far as it goes....but real issues may be eliminiating unnecessary trips (even if at 40 mpg)....what about recreation.... trips to Europe, Mexico, N.Y.C., etc? R.V.'s? Public seems confused...what to do about buying R.V.'s, pleasure crafts, trips, etc....even Christmas lights. More direction needed (from top)."

Energy Audit of Your Home

Fall, 1977

Item response distribution of 10 randomly sampled Audits returned by parents

Try taking an inventory of your home's energy conservation readiness. See how you score on the readiness scale.

The House Itself:			Pts.	No Response
Has 6" of ceiling insulation	4 Yes 3 pts.	5 No 0	_____	1
3" to 6" of ceiling insulation	5 Yes 2 pts.	5	_____	
Has broken or cracked windows	9 Yes (-1 pt.)	10 No 1	_____	
Has weather stripping around exterior doors	7 Yes 2 pts.	1 No 0	_____	2
Windows are tightly caulked	5 Yes 1 pt.	3 No 0	_____	10

(An energy efficient home would score at least 5 points in this area.)

Sub-total _____

$\bar{X}$=5.1

Heating System			Pts.	
Daytime temperature set at 65° or lower *(Each degree above 65° adds 2% to heating bill)*	9 Yes 3 pts.	1 No 0	_____	
Night-time temperature set at 55° *(Each degree above 55° add 1% to heating bill)*	7 Yes 2 pts.	1 No 0	_____	2
Drapes are closed at night to keep heat in	10 Yes 1 pt.	No 0	_____	
Furnace filters are changed at least monthly during heating season	8 Yes 1 pt.	1 No 0	_____	1
Thermostat "on" temperature is correct within 2 degrees *(Check this by turning thermostat up until heat "clicks" on. Turn back and notice at what temperature thermostat "clicks" off. Compare with actual temperature)*	9 Yes 1 pt.	1 No (-1)	_____	
Thermostat has positive "off" *(Electric heat only. A definite "click" should be heard in going to the lowest position)*	7 Yes 1 pt.	0 No (-1)	_____	3

(An energy efficient home would score at least 6 points in this section)

Sub-total _____

$\bar{X}$=7.4

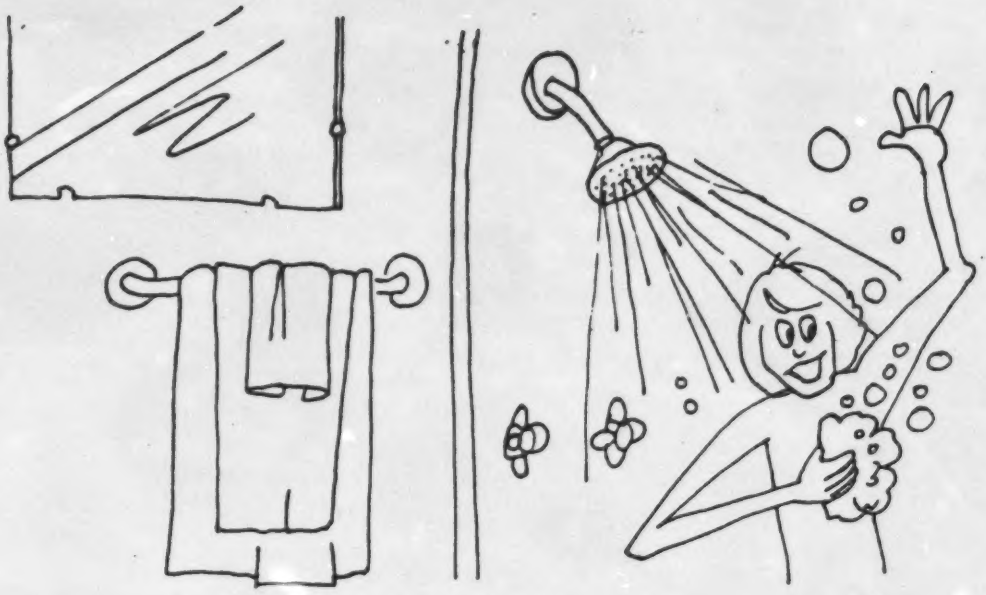
Appliances

			Pts.	N.R.
Have two or more refrigerators in use	Yes (–1 pt.) *(for each over one)*	No 1		
Refrigerator is self-defrost in both compartments	Yes 0 pts.	No 1		
Cold section of refrigerator is set for 40°	Yes 1			
35°-39°	0			
below 35°	(–1)			
Refrigerator seals are tight enough to hold up a dollar bill when door is closed on the bill.	Yes 1 pt.	No (–1)		
Refrigerator coils have been vacuumed within past 3 months	Yes 1 pt.	No (–1)		
Freezer frost buildup is less than ¼ inch	Yes 1 pt.	No (–1)		
Proper size pans used on range burners	Yes 1 pt.	No 0		
Dishwasher is run for full loads only (or once per day)	Yes 1 pt.	No 0		
Cold water is used for non-white washes	Yes 1 pt.	No 0		
Clothes washer is run for full loads	Yes 1 pt.	No 0		
Clothes dryer is run for full loads	Yes 1 pt.	No 0		
Television has "instant-on" feature	Yes (–1 pt.)	No 0		

(A minimum score of 7 should be achieved in this section)

$\bar{x}=7.3$

Sub-total _____



Water and Hot Water Use

			Pts.	N.R.
Hot water heater is set at 140° or lower (medium setting)	Yes 1 pt.	No 0	_____	
Any member of family takes showers longer than 5 minutes	Yes (–1 pt.)	No 1	_____	
There are leaky hot water faucets	Yes (–1 ea.)	No 1	_____	1
There are leaky cold water faucets	Yes(–½ ea.)	No 1	_____	1
There is a water displacement device in toilet tank	Yes 1 pt.	No 0	_____	1
Toilet tank leaks, water runs continuously	Yes (–1 pt.)	No 0	_____	1
Lawn is deep soaked once instead of several shallow soakings	Yes 1 pt.	No (–1)	_____	1
Hose is used to wash off sidewalks	Yes (–1 pt.)	No 0	_____	6
Lawn watered only in cool part of day	Yes 1 pt.	No (–1)	_____	1
Flow restrictor devices are used on showerheads	Yes 2 pts.	No 0	_____	2
Flow restrictor devices are used on other taps	Yes 1 pt.	No 0	_____	3

(A minimum score of 6 points should be achieved in this section)

Sub-total _____

F=45

N.K.

Travel & Transportation

			Pts.
Drivers obey 55 MPH limit	Yes 3 pts.	No (–1)	_____
Shopping trips are planned so that one trip is made to cover 4 or 5 errands rather than 4 or 5 separate trips	Yes 2 pts.	No (–1)	_____
Tires are kept properly inflated	Yes 1 pt.	No 0	_____

(A minimum score of 6 points should be achieved in this section)

Sub-total _____ $\bar{X}=5.0$

Lighting

			Pts.
Lights are not left on in unoccupied rooms	Yes 2 pts.	No 0	_____
Light bulbs over 40 watts not used for night lights	Yes 1 pt.	No 0	_____
Infrared heat lamps used for night lights	Yes (–2 pts.)	No 0	_____
100 watt bulbs used for reading instead of larger size	Yes 1 pt.	No (–1)	_____
At least one room of house has fluorescent light for *main source* of light	Yes 1 pt.	No 0	_____

(A minimum score of 5 points should be achieved in this section)

Sub-total $\bar{X}=3.4$

Total Points for All Sections $\bar{X}=32.7$

These are the basic areas of energy use in the home. Rate yourself according to the following scale:

34 points or over—Very good. You are doing a good job in reducing or eliminating the waste of energy.

29-33 points —Fair. With a little extra concentration you could achieve an energy efficient life style.

Below 29 points —Poor. You are definitely wasting energy. First develop those practices that cost little or nothing to achieve such as weather stripping, caulking, better use of lighting, shorter showers, etc., then, when possible, insulate ceilings, water heater, buy water flow restrictor devices.

Bonus Points

Check the following area for bonus points: The items mentioned are not found in all homes but are important energy users.

			Pts.	
Air conditioners set at 78° of warmer	Yes 2 pts. (2)	No 0 (0)	_____	NR / 8 NR
Air conditioner filters cleaned within past 3 months	Yes 1 pt. (2)	No 0 (0)	_____	8
Autos get better than 22 MPG	Yes 2 pts./auto (7)	No (−1 per auto) (0)	_____	3
At least one trip per week is made on public transportation (do not include school buses)	Yes 1 pt. (3)	No 0 (4)	_____	3
Have microwave oven	Yes 1 pt. (0)	No 0 (3)	_____	7
Have enclosed patio that traps heat during the day and acts as a passive solar heating system	Yes 2 pts. (2)	No 0 (1)	_____	7
Have solar water heating	Yes 2 pts. (1)	No 0 (3)	_____	6
Fireplace damper closed when fire is out	Yes 1 pt. (1)	No 0 (0)	_____	4
At least one gas appliance has an automatic electric pilot light	Yes 1 pt. (3)	No 0 (3)	_____	4
Thermostats have automatic night set-back	Yes 2 pts. (3)	No 0 (2)	_____	5
Unused rooms heating vents closed off	Yes 1 pt. (6)	No 0 (1)	_____	4
Hot water heater has insulating blanket on	Yes 1 pt. (1)	No 0 (4)	_____	5
At least one member of family is in a car pool	Yes 2 pts. (4)	No 0 (1)	_____	5

Revised Total _____

Total $\bar{x}$ = 38.6